

THREE NEW SPECIES OF *PSYCHONOTIS TOXOPEUS* (LEPIDOPTERA: LYCAENIDAE) FROM PAPUA NEW GUINEA

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Abstract

Psychonotis parsonsi sp. n., *P. marginalis* sp. n. and *P. finisterre* sp. n. are described and figured from New Ireland, the Central Highlands and the Finisterre Range, Papua New Guinea, respectively. Male adults and genitalia of all known Papuan *Psychonotis* *Toxopeus* species are illustrated and, together with known Solomon Island species, assigned to four species-groups.

Introduction

The genus *Psychonotis* *Toxopeus* is known from Sulawesi and the Moluccas, through mainland New Guinea and eastern Australia, to the Solomon and Loyalty Islands (Parsons 1998). Tennent (1999) described four species from the Solomon Islands, one of which, *P. slithyi* Tennent, had previously been confused with *P. kruera* (Druce). These, together with the new species described below (including *P. parsonsi* sp. n., of which Parsons (1998) had made reference to a single male in The Natural History Museum, London), and the nine species recognised by Hirowatari (1992), bring the total number of known *Psychonotis* species to 16.

Abbreviations in this work are as follows: ANIC – Australian National Insect Collection, CSIRO, Canberra; BMNH – The Natural History Museum, London; CJMC – Private collection of C. J. Müller, Sydney.

Systematics

Psychonotis parsonsi sp. n.

(Figs 1, 2, 17)

Type material. *Holotype* ♂ (genitalia dissected and attached to specimen), PAPUA NEW GUINEA: 6 km SE Poronbus, central New Ireland, 12.x.2000, C.J. Müller (in ANIC). *Paratypes*: 3 ♂♂, same data as holotype (CJMC); 1 ♂, New Ireland, xi.1923, A.F. Eichhorn, genitalia slide No. G.E.T. 1963-568 (BMNH).

Description. Male (Figs 1-2). Forewing length 17 mm; antenna 9 mm. Head black; antenna black, weakly ringed white; labial palpus black, grey beneath. Thorax black with fine brown hairs; legs grey-black. Abdomen grey-black. Forewing with costa and termen weakly convex, inner margin nearly straight; above iridescent sky blue, termen with dark brown border, *c.* 2 mm wide; cilia dark brown; beneath, white, broad costal and outer marginal black-brown area, latter encompassing a row of metallic blue-green subterminal striae. Hindwing with inner margin and termen convex, latter especially near tornus, costa nearly straight; above, iridescent sky blue with white median area, gradational with ground colour towards costa, outer margin broadly dark brown, *c.* 3 mm wide, costa light brown, cilia dark brown; beneath plain white, base and outer margin brown-black, former with minor metallic green

scaling at contact with ground colour, a row of green-ringed brown-black subterminal spots, open towards termen between vein M_3 and costa.

Genitalia (Fig. 17). Sociuncus weakly saddle-shaped, both anteriorly and laterally; brachium slender, strongly tapered, valva rectangular shaped laterally, pointed apically, squared at anteriorly when viewed ventrally; aedeagus broad, tapered to a sharp point apically.

Female. Unknown.

Etymology. This new species is named in honour of Dr. Michael Parsons.

Early stages. Unknown.

Remarks. *Psychonotis parsonsi* is a highly distinctive taxon. It was initially recognised and illustrated by Parsons (1998), from a single male (in BMNH) taken at an unknown locality in New Ireland by A. F. Eichhorn during 1923. *P. parsonsi* is closest to *P. brownii* (Druce & Bethune-Baker), with which it flies in New Ireland; however the former is much larger than *P. brownii* and the hindwing is subtly but consistently more pronounced along the termen, close to the tornus. The upperside metallic sky blue ground colour is distinctive in *P. parsonsi*, bearing a white median patch on the hindwing. Beneath, *P. parsonsi* and *P. brownii* are similar but the white median area on the forewing forms a gradual line near the base in the former species, while in *P. brownii* it is abruptly oblique near the base. Additionally, the brown outer margin on the underside terminates at the inner margin closer to the base in *P. brownii* than in *P. parsonsi*.

The male genitalia of *P. parsonsi* are similar to those of *P. brownii* but the crown of the sociuncus is laterally flat-topped, the valva is longer and squared and the aedeagus is much broader and less tapered than that of *P. brownii*.

Psychonitis marginalis sp. n.

(Figs 7, 8, 20)

Type material. Holotype ♂ (genitalia dissected and attached to specimen), PAPUA NEW GUINEA: Amazon Bay area, Komania, 3400 ft. 11-26.xi.1962, W.W. Brandt (in ANIC). Paratypes: 4 ♂♂ same data as holotype; 8 ♂♂, labelled 'Komania', pinned but unset (all in ANIC).

Description. Male (Figs 7-8). Forewing length 14 mm; antenna 7 mm. Head black with eye ringed green; antenna black, ringed white; labial palpus black dorsally, light grey beneath. Thorax black with fine grey hairs, beneath grey; legs dark grey. Abdomen dark grey ringed between segments with green, beneath grey. Forewing with costa very weakly and termen moderately convex, inner margin slightly concave; above medium lustrous lilac-blue, termen very broadly dark brown, tapering towards apex, cilia dark brown; beneath, ground colour brown-black, a plain white median area extending from inner margin to subapical area and from subbasal to subterminal area, metallic green area from base to postmedian area below costa.



Figs 1-16. *Psychonotis* males from Papua New Guinea, even numbers undersides, odd numbers uppersides. (9, 10) *P. caelius* (central highlands); (11, 12) *P. caelius* (New Ireland); (13, 14) *P. hebes* (central highlands); (7, 8) *P. marginalis* (central highlands); (15, 16) *P. finisterre* (Finisterre Range); (5, 6) *P. kruera* (Bougainville); (1, 2) *P. parsonsi* (New Ireland); (3, 4) *P. brownii* (New Ireland). Scale bar = 10 mm.

Hindwing with costa and inner margin slightly and termen moderately convex; above medium lustrous lilac-blue, darker at base, outer margin very broadly dark brown, costa and basal one third of inner margin white, sometimes with white median patch, cilia dark brown; beneath plain white, base and outer margin brown-black, latter with a series of metallic green-ringed, brown-black subterminal spots, base with metallic scales below Sc+R₁.

Genitalia (Fig. 20). Sociuncus narrowly U-shaped anteriorly, rather square laterally; brachium blunt; valva bowed along ventral edge, tapered upward to a sharp point apically; aedeagus long, finely tapered.

Female. Unknown.

Remarks. *Psychonotis marginalis* shares characters with both *P. hebes* (Druce) (Figs 13-14) and *P. caelius* (C. & R. Felder) (Figs 9-12) but is readily separated from these taxa by the following differences: *P. marginalis* has much broader brown-black margins on the upperside of both wings than either *P. hebes* or *P. caelius* and the forewing termen is more convex than in the latter two taxa. *P. marginalis* is smaller than *P. hebes* and the upperside ground colour is midway between *P. hebes* and *P. caelius*, being a distinctive lilac blue. Several specimens of *P. marginalis* bear white median patches on the hindwing upperside. The underside of *P. marginalis* is similar to *P. caelius* but the white median area of the forewing is rounded near the apex, while it is reduced in *P. caelius*. Though not particularly clear from the figures, the metallic markings on the underside are grass green in *P. marginalis*, while in *P. caelius* they are distinctly blue-green.

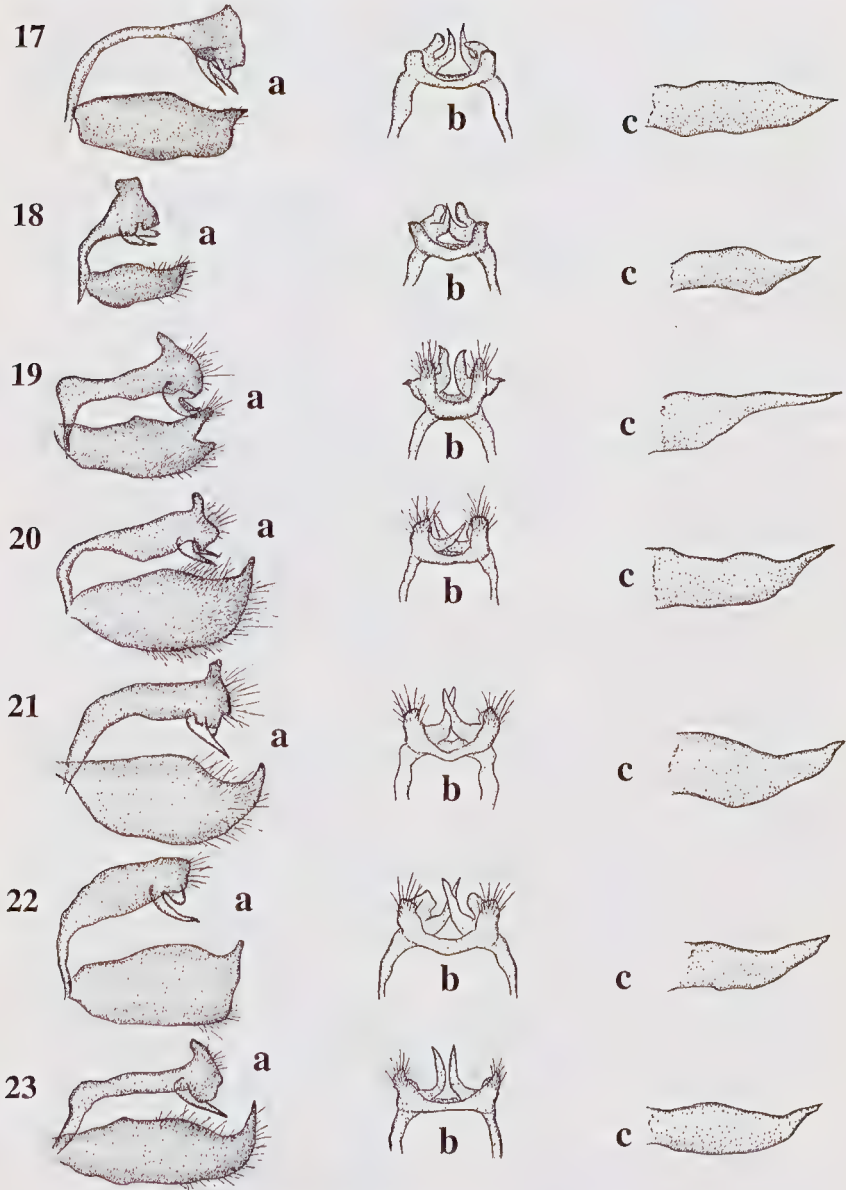
The male genitalia of *P. marginalis* most closely resemble those of *P. hebes* but the valva is more apically pointed, the aedeagus is much more tapered and, when viewed laterally, the sociuncus of *P. marginalis* bears a dorsal crown, not present in *P. hebes*.

Psychonotis finisterre sp. n.

(Figs 15, 16, 23)

Type material. Holotype ♂ (genitalia dissected and attached to specimen), PAPUA NEW GUINEA: Finisterre Range, Gabumi, 2000 ft, 23.vi.-21.vii.1958, W.W. Brandt (in ANIC).

Description. Male (Figs 15-16). Forewing length 15 mm, antenna 7 mm. Head black with eye ringed green ventrally, antenna black, ringed white; labial palpus black dorsally, grey beneath. Thorax black with fine grey hairs above and beneath, legs dark grey. Abdomen dark grey, ringed green between segments. Forewing with costa and termen weakly convex, inner margin straight; above dark lustrous blue, termen narrowly dark brown, cilia dark brown; beneath dark brown with large plain white median area from vein 1A+2A to subapical area, linear at submedian and subterminal area, faint green scaling at base and subbasal area near costa.



Figs 17-23. *Psychonotis* spp., male genitalia: a, lateral view; b, sociuncus (dorsal view); c, aedeagus (lateral view). (21) *P. caelius*; (22) *P. hebes*; (20) *P. marginalis*; (23) *P. finisterre*; (19) *P. kruera*; (17) *P. parsonsi*; (18) *P. brownii*. Scale = 0.5 mm.

Hindwing with termen and inner margin slightly convex, costa fairly straight; above dark lustrous blue, costa, termen and inner margin with c. 1.5 mm wide dark brown border, cilia dark brown; beneath plain white, base and outer margin broadly dark brown, latter enclosing a series of narrowly light, lustrous green-ringed spots, from tornus to vein M_2 , vestigial spot between M_1 and M_2 , base with faint blue-green scales.

Genitalia (Fig. 23). Sociuncus broadly U-shaped, both anteriorly and laterally, thereby exaggerating the anterior lateral processes; brachium long, slender; valva long, tapering upward apically, flattened laterally; aedeagus elongate, tapered apically.

Female. Unknown.

Remarks. *Psychonotis finisterre* may only be confused with *P. caelius* (Figs 9-12) but the two are distinct in several respects. Above, the blue ground colour is much darker in *P. finisterre* and the hindwing brown border is broader. Additionally, *P. finisterre* lacks the white costa present in *P. caelius*. Beneath, the white area on the forewing is much reduced in *P. finisterre*, with the edges being fairly normal to the inner margin. The metallic green areas beneath in *P. finisterre* are much reduced and duller than in *P. caelius*.

The male genitalia of *P. finisterre* resemble those of *P. caelius* (Fig. 21) but the valvae are rather flattened, the aedeagus is much more tapered apically and, when viewed laterally, the sociuncus crown is bent backward.

Discussion

The external morphology, male genitalia and distribution of known *Psychonotis* taxa imply that there are four well-defined species-groups within Papua New Guinea and the Solomon Islands. The diagnosis of these proposed species-groups is as follows:

caelius species group

Includes *P. caelius* (C. & R. Felder), *P. hebes* (Druce), *P. marginalis* sp. n. and *P. finisterre* sp. n. (Figs 7-16, 20-23).

External facies. Characterized by the presence of green scales on the forewing underside costa and base. The spots on the hindwing underside are completely enclosed with metallic scales (vestigial in *P. hebes*).

Male genitalia. Valva elongate laterally, canoe-shaped, apically pointed upwards.

Distribution. All species occur parapatrically and are restricted to mainland New Guinea, with the exception of the wide ranging *P. caelius*.

brownii species group

Includes *P. brownii* (Druce & Bethune-Baker) and *P. parsonsi* sp. n. (Figs 1-4, 17-18).

External facies. Both species with subterminal metallic striae on the forewing underside.

Male genitalia. Valvae rather squared but tapered to a blunt point apically.

Distribution. Sympatric species known only from the Bismarck Archipelago.

kruera species group

Includes *P. kruera* (Druce) *P. slithyi* Tennent, *P. eleanor* Tennent and *P. waihuru* Tennent (Figs 5-6, 19).

External facies. All species with metallic markings on underside restricted to a narrow row of spots on the hindwing margin. The black hindwing underside border is distinctly stopped at vein M_1 .

Male genitalia. The male genitalia of those species examined (single known male of *P. waihuru* not dissected) have the valva bifurcated posteriorly.

Distribution. All species occur allopatrically in the Solomon Islands, Bougainville, Woodlark and Misima Islands.

julie species group

Includes only *P. julie* Tennent.

External facies. Underside forewing with broad black postmedian band.

Male genitalia. Tennent (1999) showed that the male genitalia are typical of *Psychonotis*.

Distribution. Single highly distinctive species restricted to the island of San Cristobal, Solomon Islands.

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